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A Closed Circuit Anaesthetic Apparatus for Adult Cattle and for Horses

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BEFORE World War II the commonest method of producing general anaesthesia in horses and cattle was that of administering chloroform by means of a simple face mask. Although it was known that ether was less toxic than chloroform, ether was not used for large animals because satisfactory means of procuring sufficient concentration of the vapour in inspired air were not available.

During the war years and post-war years improved methods of anaesthesia in large animals were developed and Gold (1946) and Wright (1946) both drew attention to the usefulness of chloral hydrate as an intravenous anaesthetic. New intravenous anaesthetics also became available and Francis and Parry (1949) introduced β naphthoxyethanol and Harrow (1950) β naphthoxyethanol with thialbarbitone.

During this period the rapid advances which took place in anaesthesia in the human subject were paralleled in canine work particularly in relation to volatile and gaseous anaesthetics. Apparatus developed for human subjects required little adaptation for use in small animals.

Because the use of closed circuit apparatus had proved satisfactory in small animals it seemed reasonable to suppose that an apparatus for use in large animals would be equally advantageous.

In the Glasgow Veterinary School the standard Boyles or Gillies apparatus is found to be satisfactory for sheep, pigs, small ponies and immature cattle. When attempts were made to use this apparatus for larger animals however, it proved unsatisfactory, and there were many indications that the airways and uni-directional valves were too small.

It was therefore decided to build an apparatus with airways sufficient for cows and horses. As a guide to the diameter of tubing suitable for airways in the apparatus the average diameter of tracheas of large horses (1½ inches) was selected as suitable in the first place. In order to test out such airways a cow was anaesthetised with chloral hydrate intravenously and intubated with a cuffed endotracheal tube which was attached to a 10-foot length of 1½-inch tubing. The character and rate of respiration was unaltered with and without the tubing. It was also unaltered when the tubing was coiled to increase air resistance and thus simulated a pathway through an anaesthetic apparatus. When the open end of the tubing was reduced in calibre, however, the cow was unable to deflate the lungs sufficiently and reacted quickly first with increased depth and then with an increased rate of respiration. It appeared therefore that airways of 1½-inch minimum diameter were appropriate.

Apparatus

It was planned to construct a circle absorber rather than a to-and-fro apparatus so that a vaporiser could be included in the circuit to function as a result of the animal's own respiratory efforts, and to utilise the heat resulting from the reaction between CO_2 and soda lime, as well as the heat coming from the animal's own lungs, for the vaporisation of suitable anaesthetics.

In the experimental stages it was decided to use what materials were readily available for the construction of the apparatus so that it could be dismantled and re-assembled readily. The apparatus shown in the photograph (Fig. 1) was constructed partly of 1½-inch brass plumbers' fittings, while the expiratory and inspiratory uni-directional valves, which are of the diaphragm type, and the soda lime canister and ether vaporiser were made locally. An 8-gallon breathing bag was made specially, but the 1½-inch non-kink tubing is some that is used in industry, and the flow meters are of standard pattern. The assembled apparatus was mounted on a dismantled electrocardiography trolley and though crude in appearance it is highly efficient as judged from the results.

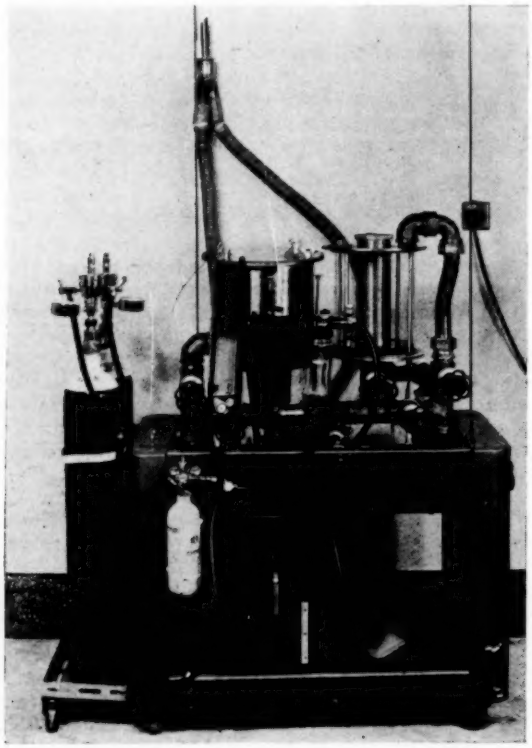

FIG. 1

Before using any volatile or gaseous anaesthetics in the apparatus it was used as a circle absorber for cows which were anaesthetised with intravenous anaesthetics. One cow received chloral hydrate for half an hour and was allowed to breathe through an endotracheal tube into the atmosphere. After this time the anaesthetic was maintained for a further 1½ hours with the circle absorber connected. During both these periods there was no appreciable difference in the character and rate of the respiration. A similar trial was made using intravenous thiopentone anaesthesia and again there were no changes in the character and rate of respiration when the animal was breathing to the atmosphere and when the circle absorber was connected.

Apparatus in Use

After these preliminary trials the apparatus was brought into routine use. Induction in each case has been by means of intravenous thiopentone sodium, and anaesthesia has been maintained by a volatile or gaseous anaesthetic on 34 cows, 17 horses and 1 donkey. A variety of operations has been performed and with the apparatus the anaesthetics maintained satisfactory anaesthesia on all occasions. In 2 cases it was necessary to maintain anaesthesia for periods of 4½ hours and 5 hours respectively with no untoward effects. It had been anticipated that there would be difficulty in providing sufficient oxygen from the standard pressure regulated valves and a 5 litre per minute flow meter. Experience has shown, however, that these fittings have provided adequate oxygen when an emergency oxygen by-pass has been used for the initial filling of the bag.

The apparatus has fulfilled in large animals all the advantages normally claimed for closed circuit anaesthesia in human and small-animal subjects. The advantages briefly are the conservation of body heat, economy in the use of expensive anaesthetic agents and retention of potentially explosive mixtures. With a closed circuit it is easy to ventilate the lungs forcibly should occasions arise when respiration becomes arrested.

The Ether Vaporiser

In the past it has often been stated that ether is unsuitable as a general anaesthetic for farm animals because of the difficulty in maintaining sufficient concentration. Even the British Veterinary Codex (1953) states that ether is ineffective as an anaesthetic in large animals. Henkels (1938) described an apparatus designed to use ether for horses but vaporisation depended on the use of hot water and expiration was directly to the atmosphere with consequent obvious waste.

Experience has shown that with the vaporiser in closed circuit (Figs. 1 and 2) the heat of reaction between CO_2 and soda lime does in fact contribute to the vaporisation of ether. By placing a thermocouple in the circuit at the point where the gases entered the ether vaporiser a temperature of 102°F. was registered after the apparatus had been in use 1 hour. The animal's rectal temperature was 100.5°F. The soda lime registered a temperature of 122°F. while the atmosphere was 61°F.

After induction with thiopentone sodium and by using the present apparatus it has been possible to maintain surgical anaesthesia in animals of weights between 10 cwts. and 16¾ cwts. with dosages of between 8 to 10 ozs. of ether per hour. Anaesthesia

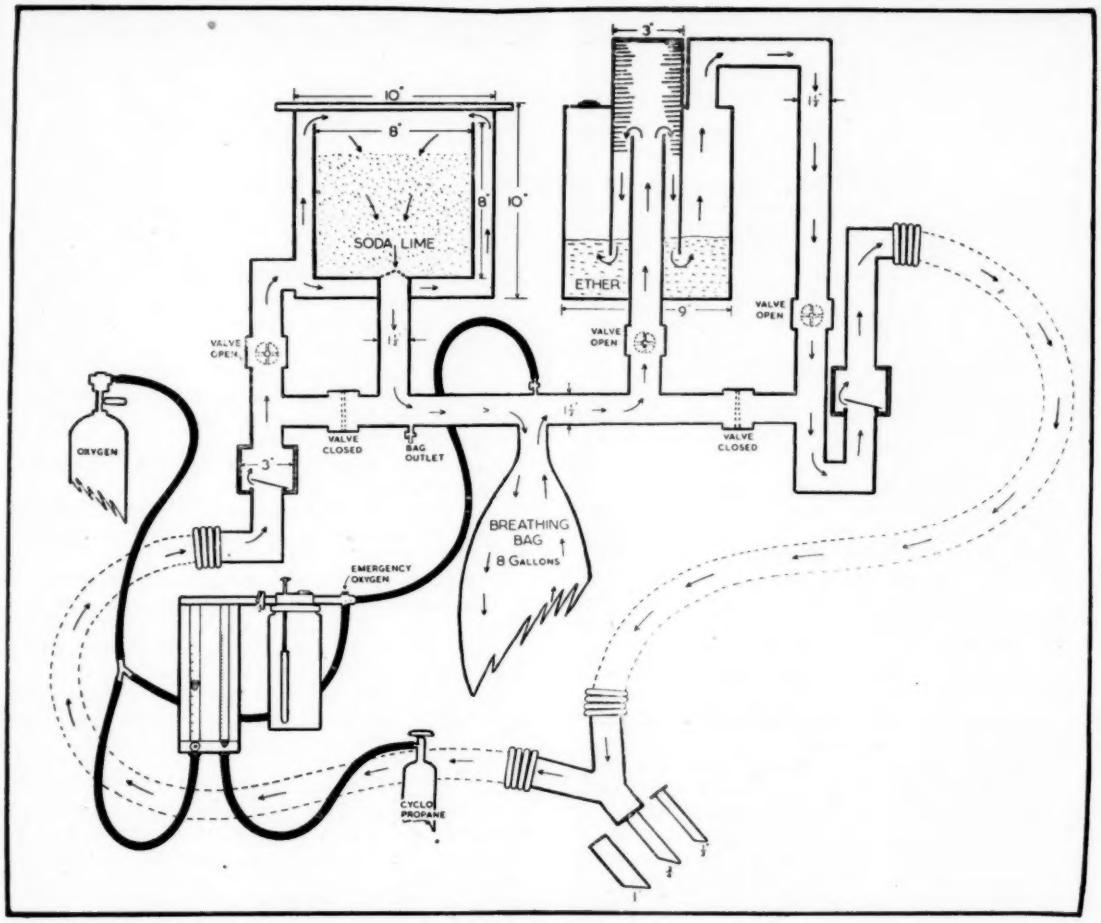

FIG. 2

has been smooth and uncomplicated by respiratory distress, and recovery has been rapid.

Acknowledgments.—The photographs were taken by A. Finnie, Glasgow University Veterinary School Photographer, to whom due acknowledgement is made and also to B. Rogerson, technician, for making the drawings and for help in constructing the apparatus.

References

BRITISH VETERINARY CODEX (1953). Pharmaceutical Press, London.
FRANCIS, J., & PARRY, H. B. (1949). *Vet. Rec.* **61.** 509.
GOLD, T. N. (1946). *Ibid.* **58.** 561.
HARROW, W. T. (1950). *Ibid.* **62.** 507.
HENKELS, P. (1938). *Deuts. Tierarztl wschr.* **46.** 801.
———. (1939). *Abs. Vet. Rec.* **51.** 980.
WRIGHT, J. G. (1946). *Vet. Rec.* **58.** 566.

RESISTANCE TO INSECTICIDES

The directors of some of the world's chief laboratories recently issued a warning that the steady increase in the number of insects resistant to insecticides is " most alarming " for the world's health. " It would be irresponsible," they say, " to dismiss the possibility of a serious increase of insect-borne diseases."

In 1949 only 2 kinds of insects affecting public health, the house fly and certain kinds of mosquitoes, were resistant to DDT. To-day they number 38, among them several kinds of malaria-transmitting mosquitoes, plague-carrying fleas, and typhus-bearing lice. Countries all over the world have spent huge sums to control the great insect-borne pestilences. Faced with the possibility of failure they have not, the scientists say, a single practical solution to-day for the control of resistant insects, except switching from one insecticide to another. The world may soon face an emergency because of the dynamic nature of the resistance problem, which intensifies day by day.

The Use of Quinine in the Treatment of Pyometra in the Bitch

BY

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Introduction

IN a survey of the literature on pyometra during the last 3 or 4 decades it is remarkable how little has been written on the treatment of this condition by methods other than surgical. This is the more remarkable when it is considered that pyometra is probably one of the commonest causes of illness, and often death, in the middle-aged and aged bitch. Surgical removal of the uterus and ovaries, though often completely successful, is nevertheless in many cases found to be impracticable. Thus, we were prompted to find a suitable medical approach as an alternative.

The use of stilboestrol has been commented on with varying success (Watson, 1942; Hancock, 1942; and Smith-Leask, 1942). Brancker (1952) used luteinising hormone, in some cases followed by progesterone implant, and reported reasonable success in cases so treated. Having used hormone therapy in this condition, however, we are of the opinion that to increase further the state of hormone imbalance—a state closely related to the aetiology of pyometra—is unwise. We have seen a sharp deterioration in an animal's condition which resulted in death after the injection of stilboestrol in small doses.

It was felt that a drug having tonic and mild ecbolic effects on the uterus was what was required. The use of gossypoid, an alkaloid of the cotton root bark, is described by Spaulding (1924) who maintained that it caused uterine contractions and evacuation of the contents. He also used daily antiseptic douches as a secondary routine. Quinine is known to have this effect on the uterus and is used sometimes by medical practitioners in obstetrical work (Dilling & Gemmell, 1930). We decided that this was the drug of choice.

Method

Quinine was used in the form of 5 gr. tablets of quinine sulphate which were reasonably easy to administer by the owner. Dosage varied from 2½ to 10 g. initially, followed by half this quantity each day. Treatment was continued for 7 to 10 days, as is required. Where there was any recurrence this treatment was repeated.

Results and Case Reports

The treatment has now been used in 52 cases which varied in age from 6 to 12 years, and which were of many different breeds. Three of the bitches were known to have had at least 1 litter of pups before becoming affected, and 1 has had a litter since.

As far as can be ascertained none of the cases so treated has died as a result of pyometra. Six representative cases are reported below.

Case 1

Subject. Nine-year-old Cairn Terrier.

History. The owner reported that the bitch had been ill for about a week. She had been in oestrus about a fortnight previously, and the discharge had continued, gradually becoming more purulent. There was complete anorexia and excessive thirst; she frequently vomited what she drank.

Clinical Findings. Temperature 100.5° F., pulse 144 per minute. The abdomen was slightly distended, and a purulent discharge from the vulva was obvious.

Open pyometra was diagnosed.

Treatment. Two and a half gr. quinine sulphate daily for 1 week.

The owner was informed of the grave prognosis and asked to keep the veterinary surgeon informed on her progress.

Sequel. Nothing was heard, but on returning to the farm some time later on another case, we were most surprised to find the bitch in perfect health.

There was no recurrence and the bitch died 3 years later from other causes.

Case 2

Subject. Nine-year-old Welsh Corgi.

History. Had been in oestrus 5 weeks previous to our first seeing her. The client complained of her lack of appetite and listlessness, and also her excessive thirst, which was unusual in a bitch disinclined to much water. She had never had pups.

Clinical Findings. Temperature 99.5 ° F., pulse 144 per minute and of so-called " thready " character.

The abdomen was distended but there was no discharge from the vulva. The distended horns of the uterus could be palpated with reasonable pressure, sufficient to allow a diagnosis of closed pyometra.

Treatment. Five gr. quinine sulphate were given daily. The bitch was visited 2 days later, and there was now some discharge; the temperature was still slightly subnormal at 100° F., and the pulse was still " thready." The appetite had not improved, and there was great thirst.

She was seen again after a further 2 days. The discharge had become copious and the animal was a little brighter. Otherwise the picture remained as before.

The following week the owner reported her to have parted with " pints of pus "; her appetite had improved together with her general demeanour.

In 3 weeks she appeared quite normal.

Two years later the owner reported that she suspected a recurrence. On examination the bitch proved to be pregnant, mating having occurred accidentally.

Because of the oversize of the foetuses a caesarean section was performed, successfully.

To our knowledge the bitch still enjoys as reasonable health as her age permits.

Case 3

Subject. Seven-year-old Cocker Spaniel.

History. This bitch had had 1 litter of pups when quite young but had not been bred from since then. The owner complained of her having "eaten something" which resulted in all her food and drink being vomited. The bitch had been in oestrus recently, and the client gave the impression that she felt this to be the motive that prompted some neighbour to lay poison.

Clinical Findings. Temperature 105° F., pulse 180, full in volume but not hard as in chronic nephritis. The abdomen was not unduly distended and the uterine horns could not be palpated. There was a slight purulo-haemorrhagic discharge from the vulva, unnoticed by the owner.

The information regarding appetite and thirst was felt to be unreliable.

A tentative diagnosis of pyometra was made.

Treatment. Five gr. quinine sulphate daily, in this case divided into 2 doses. On the first day 250,000 I.U. crystalline penicillin G with 0.25 gramme streptomycin and 0.25 gramme dihydrostreptomycin were given intramuscularly.

In 2 days temperature was 102.5° F., pulse 160, but unreliable due to patient's excitable nature.

The discharge had decreased slightly. A further antibiotic injection was given to control secondary infection, and the quinine was continued for a further week.

Recovery was uneventful.

Case 4

Subject. Twelve-year-old mongrel.

History. The animal's abdomen had been seen to be gradually increasing in size. She had not, to her owner's knowledge, been in season recently.

Clinical Findings. Temperature 101.2° F., pulse 90 per minute. The bitch did not appear too dull. The abdomen was greatly distended but there was no vulvar discharge.

The horns of the uterus could be palpated.

A very tentative diagnosis of pyometra was made.

Treatment. Ten gr. quinine sulphate as an initial dose followed by 5 gr. daily for 10 days. The bitch started to discharge thick, apparently sterile pus, having a characteristic, heavy odour. This continued for 2 weeks, at the end of which time the abdomen had returned to normal.

Unfortunately it was not possible to trace the case from here and so the ultimate end is unknown.

Case 5

Subject. Eight-year-old Alsatian.

History. The bitch first showed signs of illness about 3 weeks after having been in oestrus. She showed excessive thirst, frequent vomiting, and anorexia.

Clinical Findings. Temperature 101.4° F., pulse 100 per minute and of reasonable volume, though, as in many dogs, irregular. The abdomen was swollen but not markedly so, and tension prevented accurate palpation. The bitch, though dull, was by no means moribund. There was a fetid vulvar discharge.

Open pyometra was diagnosed.

Treatment. Ten gr. quinine sulphate were given as an initial dose and then 5 gr. daily for 7 days.

Sequel. The bitch had shown marked improvement by the end of the week's treatment. In 6 weeks the discharge returned, together with some degree of anorexia. Once again 10 g. were given as an initial dose, followed by 5 gr. daily for a week. The discharge disappeared and the patient's general condition improved.

After 2 months she relapsed again and similar treatment resulted in a similar improvement which has now been maintained for over a year.

Case 6

Subject. Eight-year-old Alsatian.

History. Very similar to the previous case.

Clinical Findings. Also similar to those seen in Case 5.

Treatment. The same as for Case 5.

This case is included as it was the only other one seen to have a recurrence—again after 6 weeks—and then only mildly.

The second course of treatment was final.

Discussion

The use of surgery in the treatment of this ailment has long been considered the most efficient means of removing the cause and, moreover, the fear of recurrence. We have, however, often found clients who were unwilling to submit their pets to surgical interference of any kind.

Here, in our opinion, is an efficient means of treating pyometra medically, with a drug possessing a quality all too rare in present-day therapeutic practice—cheapness. After its use, as we have seen, a bitch may still be fit to produce a litter of pups, not always desirable perhaps, but quite impossible after hysto-variectomy.

The action of the drug appears to be tonic and mildly ecbolic in that uterine contractions are initiated with, presumably, relaxation of the cervix causing evacuation of the contents. Presumably the beneficial effect extends to the secretory glands of the endometrium preventing further production of the purulent matter. Pyometra usually occurs during the luteal phase of the oestrus cycle. In the bitch this lasts for a period equal to that of gestation. This is often accompanied by the phenomenon of pseudo-pregnancy. It is interesting to note that in both our cases which had a recurrence of the condition, this coincided with the termination of the luteal phase.

In presenting these cases we hope our observations may prove useful to those confronted with this unpleasant ailment and hope to hear of others' experience in the use of this drug.

(*Concluded at foot of col. 1 overleaf*)

Oöphorectomy in the Radical Treatment of Pyometra

BY

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THE first operation of a series was carried out a little over 3 years ago. The writer was asked to treat a Persian queen cat of 4 years of age which had suffered recurrent attacks of pyometra with profuse discharge. The animal had previously been treated in various parts of the country with antibiotics, sulpha drugs, etc., but recurrence was frequent, and there were increasingly shorter intervals between the visible attacks.

When first examined the cat was in very poor condition; she had not eaten for days, was vomiting frequently and had a subnormal temperature of 100°F. In view of the history a radical operation was indicated but because of the animal's toxic condition the prognosis was not very good.

The cat was given repeated injections of glucose-saline over 24 hours and the vomition ceased. The temperature rose slightly but was still subnormal.

Operation

A site was prepared on both flanks. Anaesthesia was induced with chloroform (which has been found amazingly non-toxic in cats in operations of short duration). An incision, rather less than 1 inch long, was made through one flank and the muscle layers, peritoneum, etc., and opened in the usual way. The ovary was found, grasped with forceps, and drawn from the abdominal cavity together with the broad ligament and a part of the uterine horn. The horn was distended and measured about 1 inch in diameter an inch from the Fallopian tube. Without dividing the broad ligament a braided silk ligature was applied slightly above the ovary and at the beginning of the uterine horn. Only one ligature was used, and the ovary, part of the broad ligament and the Fallopian tube were excised. The same procedure was carried out on the other side. Muscles and peritoneum were closed with a single catgut suture and the skin with two nylon sutures. Before closing the second side 1 mega unit of penicillin was dusted into the abdominal cavity.

Results

The cat was reasonably bright the following day and took milk.

There was a profuse pustulent discharge for 3 days after which the animal was eating normally and went home. There were no set-backs and the cat made an uneventful recovery.

Since the case described above 9 cats and 7 bitches have been operated on in the same way. In the case of one bitch cystic calculi occurred 4 months after the oöphorectomy and the usual operation was carried out. As surmised, the womb had atrophied and was represented by little more than a fibrous cord about $\frac{1}{8}$ inch in diameter.

In the case of some bitches, it was found to be expedient to administer a small dose of pituitrin on the fourth day to contract the womb and speed the expulsion of any remaining pus. In some cases, both cats and dogs, systemic administration of antibiotics was used in addition to the intraperitoneal dose.

By using this method of operating the writer finds that he approaches cases of pyometra, especially in the cat, in a much more optimistic frame of mind than was the case when the usual surgical treatment was adopted.

The Use of Quinine in the Treatment of Pyometra in the Bitch.—*Concluded.*

Summary

The treatment of 52 cases of pyometra in the bitch is described using quinine sulphate.

Dosage was at the rate of 2½ to 10 gr. initially, followed by half this quantity daily for 7 to 10 days.

Detailed reports are given where necessary.

It is considered that quinine sulphate is an efficient, cheap, and easily administered means of treating pyometra.

Acknowledgment.—We should like to thank Miss Tuck, Assistant Librarian to the Royal College of Veterinary Surgeons, for help in seeking references in this subject.

References

BRANCKER, W. M. (1952). *Vet. Rec.* **64.** 61.
DILLING AND GEMMELL (1930). *J. Obstet. Gynaec.* **37.** 529.
HANCOCK, R. C. G., & SMITH-LEASK, R. J. (1942a). *Vet. Rec.* **54.** 507.
SPAULDING, R. H. (1924). *J.A.V.M.A.* **64.** 338.
WATSON, M. (1942b). *Vet. Rec.* **54.** 489.

RESIDUES FROM CHEMICALLY CAPONISED POULTRY

The Ministry of Agriculture issues a warning that purchasers of poultry offals or residues for animal feeding, particularly to pets or to commercial fur-bearing animals, should make sure that the birds have not been chemically caponised by treatment with female sex hormone-like substances. If such offals or residues are fed to pets or to fur-bearing animals, such as mink, sterility and abortion may result.

USE OF APPROVED CHEMICAL AGENTS FOR THE CLEANSING OF DAIRY EQUIPMENT

Approval has been given by the Minister of Agriculture, under the Milk and Dairies Regulations, 1949-54, for the use of the undermentioned products as oxidising or preservative agents in the cleansing of dairy equipment: Pearson's Dairy Detergent-Sterilizer (Powder); Surge Sanitant; Tipper's Hypochlorite.

An Outbreak of Anthrax in a Hound Kennel

BY

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AND

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IN view of the rarity of anthrax in the dog it seems probable that the following outbreak will be of interest.

Subject

A 7-week-old Foxhound puppy, 1 of a litter of 9, was found dead one morning without having appeared ill previously. Later in the day a second puppy in the litter was found to be ill, and on the following day 4½ couple of adult hounds were off colour. The sick puppy was very dull indeed and had a temperature of 105°F., and slightly blood-stained faeces, but the most striking feature was a very swollen face and throat. The adult hounds also showed oedema of the face to a varying degree, some having a unilateral swelling of the parotid gland, giving rise to a generalised swelling of the entire face, lips and throat. The oldest among them, a dog aged 9 years, appeared to be the most seriously affected. The temperature of these hounds varied from 103° to 105°F. and the appetite from none to normal.

Post-mortem *Examination*

A *post-mortem* examination of the dead puppy made at this Centre showed no changes nor discharges in the natural orifices. The swelling of the throat was so intense that the puppy had obviously died of asphyxia. The submaxillary, thymus and bronchial glands were enlarged, and the trachea, pharynx and epiglottis swollen and injected, so much so that the puppy's head bore a general resemblance to that of a pig. When the skin was incised prior to opening the body a gross gelatinous infiltration of the underlying tissue was revealed. Lymph nodes throughout the body were enlarged, and patches of congestion and petechial haemorrhages were present in the lungs. The spleen seemed to be slightly enlarged but this was difficult to assess with certainty in the absence of a similar organ from a normal puppy for comparison. The kidneys were dark and congested but the capsule could be removed without difficulty. The liver was slightly enlarged and bronze in colour, but the surface was smooth and the edges sharp. The small and large intestine showed patches of haemorrhagic infiltration in the serosa. The blood was unclotted and dark red in colour.

Smears of the blood showed gram-positive bacilli morphologically resembling *Bacillus anthracis*, and when stained with polychrome methylene blue showed some evidence of capsular material in the vicinity of the bacilli. The capsules were not, however, sufficiently clear to establish the diagnosis and cultures were prepared from heart blood, lung, spleen, kidney and right and left submaxillary glands. These yielded an organism having the typical morphological, colonial, and biochemical characteristics of *B. anthracis*. The original cultures from the spleen and left submaxillary gland also contained beta-haemolytic streptococci, and those from the lung *Bacterium coli*, but *B. anthracis* was finally obtained in pure culture from all organs examined. Anthrax was subsequently confirmed in material forwarded to the laboratory of the Ministry of Agriculture and Fisheries in Weybridge, Surrey.

Treatment

Treatment of the affected animals consisted of an initial dose of 1,000,000 units of penicillin for each hound, followed by 500,000 units daily for 5 subsequent days. Within 3 days the swelling had subsided considerably in all cases, and both adults and puppy were making good progress. One fresh case occurred on the 5th day after the original outbreak. This hound was given the same treatment and within a further 5 days all the hounds had recovered.

Origin of Infection

The origin of the infection was difficult to trace as a bovine anthrax carcase had been delivered to the kennels 6 weeks previously but had been handled in a different part of the premises, and disposal and disinfection were considered to have been adequate. There was, however, circumstantial evidence that it lay in the carcase of a Jersey cow which had died suddenly while being treated with penicillin for an undetermined indisposition about 18 days previously. Smears from the spleen and blood of this cow had been negative on examination for anthrax and the carcase was dismembered and used for food in the kennel in question. A further link in this chain of circumstantial evidence was the fact that anthrax occurred only in the adult hounds and puppies which had received raw meat from this carcase, the puppies having only a very small amount. Other dogs which had just returned to the kennels and had not received any of this meat showed no signs of illness. This carcase was not, however, definitely established as the source of infection.

It is of interest to record that only 2 puppies were affected among 9 maintained in identical conditions, and only 5 couple of adult hounds among some 70 in the kennel.

Acknowledgments.—We are indebted to the local Divisional Veterinary Officer and to the veterinary surgeon in charge of the kennel for permission to publish this short article.

In Brief

Immunization against Nematodes

Numerous attempts have been made in the past to produce active immunity against nematodes using disintegrated dried or fresh materials. Any immunity occasioned by these procedures was of a low order and could not be compared with that induced by actual infection. Sarles and Taliaferro (1936) first suggested that the so-called "metabolic products" of nematodes were of some consequence in immunity and the observation by these authors that living nematodes exposed to immune serum developed precipitates around natural orifices from which such metabolic products would be expected to be discharged strengthened this view. Such metabolic products are essentially associated with living worms and this explains why material from nematodes, subjected to procedures which kill them, are ineffectual in producing any degree of immunity.

The utilisation of metabolic products from cultures of larvae of *Trichinella spiralis* and of *Nippostrongylus muris* have been shown to produce a substantial degree of immunity (Chute, 1956; Thorson, 1951), similar results having been obtained by Soulsby (1957) with respect to *Ascaris lumbricoides*. The procurement of large quantities of such metabolic products is not easy and furthermore the products obtained may well be restricted to the stage which is used for culturing. It is to be expected that different stages of the parasite's life cycle produce a variation in the antigenic patterns as is shown in the case of *T. spiralis* (Oliver-Gonzalez, 1941).

The presence of the nematode within the host would undoubtedly produce the greatest amount of the various metabolic products and 2 methods of obtaining this, yet avoiding normal development, exist. One is to irradiate with X-rays infective larval stages so as to render sterile, or even eliminate, the subsequent mature stages of the nematode, as instanced in the case of *T. spiralis* (Gould *et al.*, 1955). In this case the body is allowed the opportunity to immunize itself against the developing stages and so becomes resistant to further infection, whilst the wider implications of patency of adult worms are avoided. The other method is to alter the normal migration route and time by placing infective larval stages in an abnormal site as instanced in the case of *A. lumbricoides* (Soulsby, 1957). When infective stages are placed subcutaneously in an animal delayed hatching and migration occur; the immunity produced by such a method in the case of *A. lumbricoides* is possibly better than that induced by normal infection. Both methods allow the body to avail itself of the products of the living worms thus closely simulating natural infection.

The basis of the immune mechanism has been postulated to be "anti-enzyme" in character (Chandler, 1953). This is substantiated by Thorson (1956) who noted that oesophageal gland extracts of hookworms possessed proteolytic activities which could be inhibited by immune serum. This can be considered as external enzyme inhibition. The inhibition of internal enzymes, those which moderate the life processes of nematodes, has not yet been demonstrated, but Schwabe (1957) has shown reduced endogenous oxygen utilisation in *N. muris* larvae exposed to immune serum and before precipitates appeared at the natural orifices of the nematodes. Schwabe postulated that this was due to the inhibition of enzyme systems regulating oxygen utilisation.

E. J. L. SOULSBY (July, 1957).

References

CHANDLER, A. C. (1953). *J. Egypt. med. Ass.* **36.** 811.
CHUTE, R. M. (1953). *Proc. Helm. Soc. Wash.* **23.** 49.
GOULD, S. E., GOMBERG, H. J., BETHELL, F. H., VILLELLA, J. B., & HERTZ, C. S. (1955). *Amer. J. Path.* **31.** 933.
OLIVER-GONZALEZ, J. (1941). *J. inf. Dis.* **69.** 254.
SARLES, M. P., & TALIAFERRO, W. H. (1936). *Ibid.* **59.** 207.
SCHWABE, C. W. (1957). *Amer. J. Hyg.* **65.** 338.
SOULSBY, E. J. L. (1957). *Nature.* **179.** 783.
THORSON, R. E. (1951). *J. Parasitology.* **37.** Suppl. 19.
———. (1956). *Ibid.* **42.** 21.

NEW WHITE PAPER ON SLAUGHTER-HOUSES

The Government's long-term policy for regulating the provision of slaughter-houses in England and Wales was published in a White Paper (Cmd. 9761) on May 9th, 1956, and a further White Paper (Cmd. 243) was published on August 8th setting out the Government's detailed plans for part of that policy.

The earlier White Paper said that minimum standards would be prescribed for the construction, layout, and equipment of slaughter-houses for the purpose of securing:—

(a) the lairing, handling, and slaughtering of animals in a humane manner insofar as this object is not already met by existing regulations;

(b) hygienic conditions for the handling of carcases and offal for human consumption and adequate facilities for the efficient inspection of animals and meat; and

(c) satisfactory working conditions and welfare facilities for persons working in slaughter-houses.

Regulations prescribing and applying such standards cannot be made until enabling legislation has been passed, supplementing the powers in the Slaughter of Animals (Amendment) Act, 1954, and the Food and Drugs Act, 1955.

Meanwhile, however, some requirements for humane slaughter, to supplement the Slaughter of Animals (Prevention of Cruelty) Regulations, 1954, and requirements for hygienic conditions for the handling and inspection of animals and meat have been prepared, after consultation with the interests concerned, and the latter have been considered by the Food Hygiene Advisory Council.

These proposed requirements are set out in the new White Paper, in the form of draft regulations. Subject to the passing of the necessary enabling legislation and to any minor or drafting changes which may be found necessary, they will in due course be laid before Parliament. Until laid and approved by Parliament they have no legal force. It has been appreciated, however, that traders and local authorities who are concerned with plans to build or renovate slaughter-houses have been in some difficulty while there was no indication of the probable statutory standards, and the Government hopes that the White Paper will afford useful guidance.

The 1957 Annual Congress

SOCIAL PROGRAMME

THE events of the Congress are taking place mainly at three centres, the Arts School, the Department of Zoology and the School of Veterinary Medicine.

At the Arts School, in addition to lecture theatres for sectional meetings, there will be the B.V.A. office, Congress information and Press offices, the Trade Exhibition and a hall for coffee, buffet luncheons and tea. This hall provides a convenient place for members and their friends to meet.

On arrival members will be given a brief-case which will contain not only advance copies of sectional papers but a guide to Cambridge and the University, road map, scientific programme, exhibition programme and a booklet giving suggestions for museums, art galleries, cinemas and theatres to help those who wish to plan their own programme for the week.

Special buses will be available not only for tours but to transport people to and from the School of Veterinary Medicine which is about 1½ miles from the Arts School.

The Trade Exhibition in the Arts School will be open daily from 9.30 to 6.0. The Veterinary Scientific Exhibition consisting of over 100 demonstrations covering many fields of veterinary activity will be open daily from 9.0 to 5.0 in the Department of Zoology.

At the Arts School, coffee can be obtained every day from 10.0 to 11.0 and a buffet luncheon from 12.45 to 2.0. Tea will be served daily at 3.25 either at the Arts School or at the School of Veterinary Medicine according to where the papers are being read.

On Thursday afternoon golf competitions will be held in Cambridge, and names and handicaps should be sent to S. F. J. Hodgman, A.H.T. Canine Centre, Kennett, near Newmarket. The Club will also welcome members who would like to play at any other time during the week of Congress.

The Congress Information office situated in the Arts School is available for answering questions and to give the maximum help to visitors to plan their week.

The following programme gives an outline of some of the events which have already been organised by the Eastern Counties Veterinary Society for those not attending all the Congress professional and scientific meetings.

Programme Details

Ladies' programme, special tours, exhibitions, scientific films and evening functions.

Sunday, August 25th

Afternoon

2.30—6.0	Congress Office for general information and inquiries open at Arts School.

Evening

6.30	Choral Evensong. University Church of Great St. Mary's.
8.30	Eastern Counties Veterinary Society At Home at Winter Gardens, University Arms Hotel.

Monday, August 26th

Morning

9.30—10.45	Official Opening of Congress.
10.45	Opening of Trade Exhibition.
10.30—11.30	Ladies meet for coffee in Arts School.
11.15	Short conducted tour of Colleges for ladies, starting from the Arts School.

Afternoon

2.0	Ladies' coach tour to include Ely Cathedral, the American War Memorial, Madingley, with tea at St. Ives.
2.15	Congress tour of the Animal Health Trust's Equine Research Station and Canine Centre, Newmarket, with tea at Lanwades Park.
5.0—6.30	Tour of School of Veterinary Medicine.

Evening

9.0	Official Reception at the Old Schools.

Tuesday, August 27th

Morning

10.0	Ladies' Guild A.G.M. to which all ladies attending the Congress are invited, followed by coffee. (School of Veterinary Medicine.)
11.30	Ladies' tour of School of Veterinary Medicine.

Afternoon

2.15	Ladies' conducted tour of University Library.
2.15—3.25	Tour of School of Veterinary Medicine.
3.30	Tea.
3.45—4.55	Tour of School of Veterinary Medicine.
4.15	Ladies' informal tea at Garden House Hotel.
5.30—6.45	Films (Art School).

Evening

8.45—1.0	Ladies' Guild Dance at Dorothy Ballroom.

Wednesday, August 28th

Morning

10.0	Ladies meet for coffee at Arts School.
10.30	Whole day tour through West Suffolk with visits to include Kedington, Clare, Lavenham, Melford Hall.

Afternoon

5.10—6.15	Films (Arts School).

Evening

7.45 for 8.15	B.V.A. Annual Banquet at the Guildhall.

Thursday, August 29th

Morning

10.0	Ladies meet for coffee at Arts School.
10.30	Tour of colleges and city for ladies.

Afternoon

1.0	Visit to Bayers Biological Institute at Newmarket, with luncheon and tea. Numbers limited to 56. No charge.
2.15	Golf Competition at Gog Magog Golf Club, Cambridge.

(*Continued on page* 779)

THE ANNUAL B.V.A. CONGRESS, 1957, AT CAMBRIDGE

August 25th to 31st

PROGRAMME OF PAPERS

(Reprints of Papers for Sectional Meetings only will be obtainable in advance if applied for on the ticket form)

Monday, Aug. 26th	MORNING		AFTERNOON		
9.30–10.45	11.0	11.30–12.45	2.15–3.25	3.45–4.55	5.0–6.30
Official Opening of Congress Opening of Trade Exhibition	Council Meeting (*Arts School*)	**Presidential Address,** E. R. Callender Annual General Meeting of the B.V.A. (*Lecture Theatre, Department of Zoology*)	Immunological phenomena in parasitic diseases *Author :* Dr. E. J. L. Soulsby *Openers :* Dr. A. M. Dunn K. B. Sinclair *Chairman :* Dr. E. L. Taylor (*Lecture Theatre, School of Veterinary Medicine*)	The general examination of the bull for soundness with special reference to the assessment of fertility *Author :* P. G. Hignett *Opener :* L. E. A. Rowson *Chairman :* C. T. Murphy (*Lecture Theatre, School of Veterinary Medicine*)	**Tour of School of Veterinary Medicine**
			Tour of Animal Health Trust Equine Research Station and Canine Centre		

Tuesday, Aug. 27th	MORNING		AFTERNOON		
9.15–10.30	11.0–11.45	12.0–12.45	2.15–3.25	3.45–4.55	5.30–6.45
Myopathic conditions in animals *Author :* Dr. K. L. Blaxter *Opener :* Dr. J. N. Walton (Myopathy in Man) *Chairman :* Dr. W. R. Wooldridge (*Arts School*) Oedema disease of swine *Author :* J. F. Timoney *Opener :* M. K. Lloyd *Chairman :* D. F. Oliver (*Arts School*)	**Plenary Session** **Collateral hazards from crop spraying** *Author :* Professor Sir Solly Zuckerman, F.R.S. *Chairman :* E. R. Callender (*Lecture Theatre, Department of Zoology*)	**Research problems in animal reproduction** *Author :* Dr. T. R. R. Mann, F.R.S. *Chairman :* W. C. Miller (*Lecture Theatre, Department of Zoology*)	Bacterial endocarditis in cattle *Author :* E. T. Rees Evans *Openers :* P. J. N. Pinsent Dr. S. D. Elliott *Chairman :* Dr. A. W. Stableforth (*Lecture Theatre, School of Veterinary Medicine*) **Tour of School of Veterinary Medicine**	Mucosal disease *Author :* R. A. Huck *Openers :* A. L. Wilson Dr. A. O. Betts *Chairman :* C. H. Downe (*Lecture Theatre, School of Veterinary Medicine*) **Tour of School of Veterinary Medicine**	Films (*Arts School*)

Wednesday, Aug. 28th	MORNING		AFTERNOON		
9.15–10.30	11.0–11.45	12.0–12.45	2.15–3.25	3.45–4.55	5.10–6.15
Physiological foundations of milk production and lactational disorders *Author :* Dr. B. A. Cross *Opener :* Dr. A. Marr *Chairman :* Professor E. C. Amoroso, F.R.S. (*Arts School*) The treatment of fractures in farm animals *Author :* J. Hickman *Opener :* A. C. Shuttleworth *Chairman :* Professor A. Messervy (*Arts School*)	**Plenary Session** **Veterinary and human medicine** *Author :* Professor A. L. Banks *Chairman:* Professor L. P. Pugh (*Lecture Theatre, Department of Zoology*)	**Studies of the normal animal in relation to disease** *Author :* Sir William Slater, F.R.S. *Chairman :* J. N. Ritchie (*Lecture Theatre, Department of Zoology*)	Respiratory diseases of sheep *Author :* A. J. Stevens *Opener :* G. R. Smith *Chairman :* D. Cameron (*Arts School*) Some problems of reproduction in the mare *Author :* F. T. Day *Opener :* C. S. Haselden *Chairman :* F. G. Waddington (*Arts School*)	Enterotoxaemia of sheep *Authors :* Dr. J. J. Bullen and Mrs. Irene Batty *Opener :* W. T. Rowlands *Chairman :* Dr. K. C. Sellers (*Arts School*) Convulsive syndromes in new-born foals *Authors :* L. W. Mahaffey and P. Rossdale *Opener :* Dr. A. C. Fraser *Chairman :* P. J. Mitchell (*Arts School*)	Films (*Arts School*)

Thursday, Aug. 29th

MORNING			AFTERNOON		
9.15–10.30	11.0–11.45	12.0–12.45	2.15–3.25	3.45–4.55	5.15–6.45
Some diseases of sucking pigs *Author :* Dr. R. F. W. Goodwin *Opener :* H. I. Field *Chairman :* Professor H. G. Lamont (*Arts School*)	**Plenary Session** **The role of immunology in biology and medicine** *Author :* Dr. R. R. A. Coombs *Chairman :* Sir Alan Drury, F.R.S. (*Lecture Theatre, Department of Zoology*)	**Some factors which may influence the aetiology of diseases of the young** *Author :* Professor R. Lovell *Chairman :* Professor W. I. B. Beveridge (*Lecture Theatre, Department of Zoology*)	Studies in Scrapie *Author :* A. C. Palmer *Opener :* Dr. W. S. Gordon *Chairman :* Dr. R. E. Glover (*Arts School*)	The natural history of parasitic bronchitis *Authors :* Dr. W. F. H. Jarrett Dr. W. I. M. McIntyre F. W. Jennings and Dr. W. Mulligan *Opener :* W. H. Parker *Chairman :* J. J. Low (*Arts School*)	**Tour of School of Veterinary Medicine**
Present-day problems in veterinary therapeutics *Author :* Professor G. F. Boddie *Opener :* A. H. Dawson *Chairman :* J. McConnachie Ingram (*Arts School*)			Films (Small animals) *Chairman :* Miss J. O. Joshua (*Arts School*)	Pathological differentiation of the diseases of the central nervous system of the pig *Author :* J. T. Done *Opener :* J. B. M. Gellatly *Chairman :* E. Cotchin (*Arts School*)	
		Visit to Bayer Biological Institute 1 p.m. (limited to 56)			

Friday, Aug. 30th

MORNING		AFTERNOON		
9.15–10.30	11.0–11.45	2.15–3.25	3.30–4.40	5.40–6.30
Some respiratory diseases of pigs *Author :* P. Whittlestone *Opener :* W. A. Noble *Chairman :* Dr. W. S. Gordon (*Arts School*)	**Plenary Session** **Some clinical observations on the radiotherapy and chemotherapy of malignant tumours in dogs** *Authors :* Professor J. S. Mitchell, F.R.S., and I. A. Silver *Chairman :* Professor T. J. Bosworth (*Lecture Theatre, Department of Zoology*)	The diagnosis and surgical correction of some abnormal stifle conditions in the dog (with film) *Author :* W. B. Singleton *Openers :* M. Young K. M. Dyce *Chairman :* R. N. Phillips (*Lecture Theatre, School of Veterinary Medicine*)	The training, management and employment of various categories of dogs used by the Army *Author :* J. H. Wilkins *Opener :* N. Liakhoff *Chairman :* S. F. J. Hodgman (*Lecture Theatre, School of Veterinary Medicine*)	**Demonstration of Dog Handling by the R.A.V.C.** (*School of Veterinary Medicine*)
The relationship of soundness and conformation in the horse *Author :* H. W. Dawes *Opener :* E. Brayley Reynolds *Chairman :* E. Wilkinson (*Arts School*)		**Tour of Houghton Poultry Research Station**		

Saturday, Aug. 31st

Closing meeting of Congress.

First meeting of the Council, 1957–8.

The Social Programme (*Continued from page 777*)

2.30 Ladies' visit to Sawston Hall (with tea at Sawston Hall).

5.15—6.45 Tour of School of Veterinary Medicine.

Evening

Alumnus Association dinners.

Ladies' party at Arts Theatre with buffet supper.

8.45—10.30 Scientific Films with introductory speakers (Arts School).

Friday, August 30th

Morning

12.15 Congress photograph.

Afternoon

2.15 Tour of Houghton Poultry Research Station.

4.40 Garden Party at School of Veterinary Medicine.

5.40 Demonstration of war dogs and dog handling by R.A.V.C. (The Houghton tour will return in time for this demonstration.)

Evening

9.0—2.0 Presidential Reception and Dance at the Guildhall.

DETAILS OF AUTHORS AND OPENING SPEAKERS

Professor A. L. BANKS, M.A., M.D., F.R.C.P., D.P.H., Dept. of Human Ecology, Univ. of Cambridge. (*Wed., 11.0 a.m.*)

Mrs. IRENE BATTY, B.SC., Wellcome Research Laboratories, Bechenham. (*Wed., 3.45 p.m.*)

Dr. A. O. BETTS, M.A., PH.D., B.SC., M.R.C.V.S., Dept. of Animal Pathology, Univ. of Cambridge. (*Tues., 3.45 p.m.*)

Dr. K. L. BLAXTER, D.SC., PH.D., N.D.A., The Hannah Dairy Research Institute, Kirkhill..(*Tues., 9.15 a.m.*)

Professor G. F. BODDIE, B.SC., M.R.C.V.S., F.R.S.E., Dept. of Veterinary Medicine, Royal (Dick) School of Veterinary Studies, Edinburgh Univ. (*Thurs., 9.15 a.m.*)

Dr. J. J. BULLEN, PH.D., M.R.C.V.S., Rowett Research Institute, Bucksburn. (*Wed., 3.45 p.m.*)

E. R. CALLENDER, O.B.E., M.R.C.V.S., Animal Health Division, Ministry of Agriculture. (*Mon., 11.30 a.m.*)

Dr. R. R. A. COOMBS, PH.D., B.SC., M.R.C.V.S., Dept. of Pathology, Univ. of Cambridge. (*Thurs., 11.0 a.m.*)

Dr. B. A. CROSS, M.A., PH.D., B.SC., M.R.C.V.S., Dept. of Anatomy Univ. of Cambridge. (*Wed., 9.15 a.m.*)

H. W. DAWES, C.B.E., F.R.C.V.S., West Bromwich. (*Fri., 9.15 a.m.*)

A. H. DAWSON, M.R.C.V.S., North Walsham. (*Thurs., 9.15 a.m.*)

F. T. DAY, F.R.C.V.S., Newmarket. (*Wed., 2.15 p.m.*)

J. T. DONE, B.V.SC., M.R.C.V.S., Ministry of Agriculture Veterinary Laboratory, Weybridge. (*Thurs., 3.45 p.m.*)

D. A. M. DUNN, PH.D., M.R.C.V.S., Animal Diseases Research Association, Moredun Institute, Edincurgh. (*Mon., 2.15 p.m.*)

K. M. DYCE, B.SC., M.R.C.V.S., Dept. of Anatomy, Royal Veterinary College, Univ. of London. (*Fri., 2.15 p.m.*)

Dr. S. D. Elliott, M.D., Dept. of Animal Pathology, Univ. of Cambridge. (*Tues., 2.15 p.m.*)

E. T. REES EVANS, M.A., B.SC., M.R.C.V.S., Dept. of Veterinary Clinical Studies, Univ. of Cambridge. (*Tues., 2.15 p.m.*)

H. I. FIELD, M.SC., M.R.C.V.S., Veterinary Investigation Centre, Cambridge. (*Thurs., 9.15 a.m.*)

Dr. A. C. FRASER, PH.D., B.V.SC., M.R.C.V.S., Wokingham. (*Wed., 3.45 p.m.*)

J. B. M. GELLATLY, B.SC., M.R.C.V.S., Dept. of Veterinary Pathology, Royal (Dick) School of Veterinary Studies, Edinburgh Univ. (*Thuts., 3.45 p.m.*

Dr. R. F. W. GOODWIN, M.A., PH.D., B.SC., M.R.C.V.S., Dept. of Veterinary Clinical Studies, Univ. of Cambridge (*Thurs., 9.15 a.m.*)

Dr. W. S. GORDON, C.B.E., PH.D., M.R.C.V.S., F.R.S.E., A.R.C. Field Station, Compton. (*Thurs., 2.15 p.m.*)

C. S. HASELDEN, M.R.C.V.S., Aylesbury. (*Wed., 2.15 p.m.*)

J. HICKMAN, M.A., M.R.C.V.S., Dept. of Veterinary Clinical Studies, Univ. of Cambridge. (*Wed., 9.15 a.m.*)

P. G. HIGNETT, M.R.C.V.S., Dept. of Veterinary Surgery, Univ. of Glasgow. (*Mon., 3.45 p.m.*)

R. A. HUCK, B.SC., M.R.C.V.S., Ministry of Agriculture Veterinary Laboratory, Weybridge. (*Tues., 3.45 p.m.*)

Dr. W. F. H. JARRETT, PH.D., M.R.C.V.S., Dept. of Veterinary Medicine, Univ. of Glasgow. (*Thurs., 3.45 p.m.*)

F. W. JENNINGS, B.SC., M.AGR., Dept. of Veterinary, Biochemistry, Univ. of Glasgow. (*Thurs., 3.45 p.m.*)

Capt. N. LIAKOFF, M.B.E., Guide Dogs for the Blind Association, Caversham. (*Fri., 3.30 p.m.*)

M. K. LLOYD, B.V.SC., M.R.C.V.S., Ministry of Agriculture Veterinary Laboratory, Weybridge. (*Tues., 9.15 a.m.*)

Professor R. LOVELL, D.SC., PH.D., M.R.C.V.S., D.V.S.M., Dept. of Pathology, Royal Veterinary College, Univ. of London. (*Thurs., 12.0 noon.*)

Dr. W. I. M. MCINTYRE, PH.D., M.R.C.V.S., Dept. of Veterinary Medicine, Univ. of Glasgow. (*Thurs., 3.45 p.m.*)

L. W. MAHAFFEY, B.V.SC., A.H.T. Equine Research Station, Newmarket. (*Wed., 3.45 p.m.*)

Dr. T. R. R. MANN, M.D., SCD., PH.D., F.R.S., Dept. of Veterinary Clinical Studies, Univ. of Cambridge. (*Tues., 12.0 noon.*)

Dr. A. MARR, B.SC., PH.D., M.R.C.V.S., Sevenoaks. (*Wed., 9.15 a.m.*)

Professor J. S. MITCHELL, C.B.E., M.A., PH.D., M.B., B.CHIR., F.R.S., Dept. of Radiotherapeutics, Univ. of Cambridge. (*Fri., 11.0 a.m.*)

Dr. W. MULLIGAN, M.SC., PH.D., Dept. of Veterinary Biochemistry, Univ. of Glasgow. (*Thurs., 3.45 p.m.*)

W. A. NOBLE, M.R.C.V.S., March. (*Fri., 9.15 a.m.*)

A. C. PALMER, M.A., M.R.C.V.S., Dept. of Veterinary Clinical Studies, Univ. of Cambridge. (*Thurs., 2.15 p.m.*)

W. H. PARKER, B.SC., M.R.C.V.S., N.D.A., Veterinary Investigation Centre, Tettenhall. (*Thurs., 3.45 p.m.*)

P. J. N. PINSENT, B.V.SC., M.R.C.V.S., Dept. of Veterinary Medicine, Univ. of Liverpool. (*Tues., 2.15 p.m.*)

E. BRAYLEY REYNOLDS, O.B.E., M.R.C.V.S., Newmarket. (*Fri., 9.15 a.m.*)

P. D. ROSSDALE, B.A., M.R.C.V.S., Newmarket. (*Wed., 3.45 p.m.*)

W. T. ROWLANDS, M.R.C.V.S., D.V.S.M., Veterinary Investigation Centre, Bangor. (*Wed., 3.45 p.m.*)

L. E. A. ROWSON, O.B.E., M.R.C.V.S., Cambridge and District Cattle Breeders Ltd., Cambridge. (*Mon.., 3.45 p.m.*)

A. C. SHUTTLEWORTH, M.V.SC., F.R.C.V.S., Dept. of Veterinary Surgery, Univ. of Liverpool. (*Wed., 9.15 a.m.*)

I. A. SILVER, M.A., M.R.C.V.S., Dept. of Anatomy, Univ. of Cambridge. (*Fri., 11.0 a.m.*)

K. B. SINCLAIR, M.V.SC., M.R.C.V.S., Dept. of Animal Husbandry, University College of Wales. (*Mon., 2.15 p.m.*)

W. B. SINGLETON, M.R.C.V.S., A.H.T. Canine Centre, Newmarket. (*Fri., 2.15 p.m.*)

Sir WILLIAM SLATER, K.B.E., D.SC., F.R.I.C., Agricultural Research Council, London. (*Wed., 12 noon.*)

G. R. SMITH, M.R.C.V.S., D.V.S.M., DIP.BACT., Animal Diseases Research Association, Moredun Institute, Edinburgh. (*Wed., 2.15 p.m.*)

Dr. E. J. L. SOULSBY, M.A., PH.D., M.R.C.V.S., D.V.S.M., Dept. of Animal Pathology, Univ. of Cambridge. (*Mon., 2.15 p.m.*)

A. J. STEVENS, B.V.SC., M.R.C.V.S., DIP. BACT., Veterinary Investigation Centre, Cambridge. (*Wed., 2.15 p.m.*)

J. F. TIMONEY, M.R.C.V.S., Veterinary Research Laboratory, Dept. of Agriculture Dublin. (*Tues., 9.15 a.m.*)

Dr. J. N. WALTON, M.D., M.R.C.P., Royal Victoria Infirmary, Newcastle upon Tyne. (*Tues., 9.15 a.m.*)

P. WHITTLESTONE, M.A., B.SC., M.R.C.V.S., Dept. of Animal Pathology, Univ. of Cambridge. (*Fri., 9.15 a.m.*)

Major J. H. WILKINS, B.SC., M.R.C.V.S., Royal Army Veterinary Corps. (*Fri., 3.30 p.m.*)

A. L. WILSON, M.R.C.V.S., Veterinary Laboratory, West of Scotland Agricultural College. (*Tues., 3.45 p.m.*)

M. YOUNG, M.R.C.V.S., Ealing. (*Fri., 2.15 p.m.*)

Professor Sir SOLLY ZUCKERMAN, C.B., M.A., M.D., D.SC., F.R.S., Dept. of Anatomy, Univ. of Birmingham. (*Tues., 11.0 a.m.*)

CHAIRMEN OF CONGRESS MEETINGS

Professor E. C. AMOROSO, PH.D.,B.SC., M.B., B.CH., B.A.O., F.F.S.

Professor W. I. B. BEVERIDGE, M.A., D.V.SC.

Professor T. J. BOSWORTH, M.A., B.SC., M.R.C.V.S., D.V.S.M., Vice-President, Royal College of Veterinary Surgeons.

E. R. CALLENDER, O.B.E., M.R.C.V.S., President, British Veterinary Association.

D. CAMERON, M.R.C.V.S., D.V.S.M.

E. COTCHIN, M.R.C.V.S.

C. H. DOWNE, M.R.C.V.S.

Sir ALAN DRURY, C.B.E., M.A., M.D., F.R.C.P., F.R.S.

Dr. R. E. GLOVER, M.A., D.SC., F.R.C.V.S.

Dr. W. S. GORDON, C.B.E., PH.D., M.R.C.V.S., F.R.S.E.

S. F. J. HODGMAN, M.R.C.V.S.

J. MCCONNACHIE INGRAM, M.R.C.V.S., Vice-President, British Veterinary Association.

Professor H. G. LAMONT, O.B.E., D.SC., M.R.C.V.S.

J. J. LOW, M.R.C.V.S.

Professor A. MESSERVY, M.R.C.V.S.

WM. C. MILLER, M.R.C.V.S., F.R.S.E., President, Eastern Counties Veterinary Society.

P. J. MITCHELL, M.R.C.V.S.

C. T. MURPHY, M.R.C.V.S.

D. F. OLIVER, B.SC., M.R.C.V.S.

R. N. PHILLIPS, M.R.C.V.S., D.V.S.M.

Professor L. P. PUGH, M.A., B.SC., R.R.C.V.S., Senior Vice-President, Royal College of Veterinary Surgeons.

J. N. RITCHIE, C.B., B.SC., F.R.C.V.S., D.V.S.M.

Dr. K. C. SELLERS, PH.D., B.SC., M.R.C.V.S., D.V.S.M.

Dr. A. W. STABLEFORTH, D.SC., M.R.C.V.S., D.V.S.M.

Dr. E. L. TAYLOR, C.B.E., D.V.SC., M.R.C.V.S.,D.V.H., N.D.A., N.D.D.

F. G. WADDINGTON, B.V.SC., M.R.C.V.S.

E. WILKINSON, M.R.C.V.S., Senior Vice-President, British Veterinary Association.

W. R. WOOLDRIDGE, PH.D., M.SC., M.R.C.V.S., F.R.I.C.

Current Literature

ABSTRACTS

Influence of Vitamins upon Some Teratogenic Effects of Radiation. WOOLLAM, D. H. M., PRATT, C. W. M., and FOZZARD, J. A. F. (1957). *Brit. Med. J.* May 25th, 1957. 1,219-21.

Developmental malformations may readily be produced in the embryo by exposure of the dam to ionising radiation during pregnancy. Extensive investigations have been carried out upon chemical agents which either increase or diminish the radiosensitivity of the tissues, but little attention has been paid as yet to the possibility that the teratogenic effects of radiation may be modified in a similar fashion. It has, however, been shown that certain substances, such as cystamine, protect the developing tissues to some extent from the effects of X-radiation, and thus reduce the incidence of malformations in the offspring of dams exposed to X-radiation during pregnancy.

There is a large volume of evidence indicating that maternal hypovitaminosis or hypervitaminosis produces a wide range of deformities in the embryo. Alteration of the maternal vitamin intake produces deformities in the young similar to those which occur when the dam is exposed to ionising radiation during pregnancy. Defects of the eye and hydrocephalus which are readily produced by radiation also occur when the dam is subjected to the effects of hypovitaminosis or hypervitaminosis A. The question naturally arises whether alteration of the vitamin intake of the dam during pregnancy might not have some effect in increasing or reducing the sensitivity of the young to the teratogenic action of radiation. The present communication deals with a group of experiments using white rats in which the effects of a combination of vitamins A, B, C, D and E on the radiosensitivity of the foetus were studied.

The findings of this investigation were that the administration of this combination of vitamins to the pregnant rat increased to a marked extent the incidence in the young of anophthalmia induced by X-radiation.

There was no anophthalmia in the control group receiving no vitamins and no radiation and there was no anophthalmia in the group that received vitamins alone. So it can be assumed that neither genetic factors nor excess of any one of the vitamins had a teratogenic effect. It seems that the action of the vitamins in the combination administered is to sensitise the cells of the developing eye to the destructive action of radiation.

The authors point out that it would be most satisfactory if subsequent investigation were to disclose that a single vitamin was responsible for the effects described. There is however much evidence of interaction between the vitamins in the development of the foetus.

G. F. B.

The Erythromycin Group of Antibiotics. GARROD, L. P. (1957). *Brit. Med. J.* July 13th, 1957. 57-63.

The comparative value of a new antibiotic depends not only on its therapeutic usefulness but also on its relationship to others already in existence. If it differs little from them its discovery may not be of major importance; if it has entirely new properties it may represent a major advance. The discovery of erythromycin in 1952 must unquestionably rank as a major advance. This antibiotic has a similar range of activity to that of penicillin but there is no relationship between the two, or between it and the tetracyclines. It can be used when these earlier antibiotics are contra-indicated either by reason of sensitivity in the patient (*human*)—particularly to penicillin—or resistance in the organism—notably in staphylococci. Unfortunately staphylococci can also become resistant to erythromycin itself and where it has been extensively used resistant strains have become prevalent, even causing fatal infections on which no antibiotic had any effect. It has, therefore, been suggested, and this warning requires emphasis, that the use of erythromycin be restricted to really necessary indications.

Since 1952 several other antibiotics have been produced which stand in close relationship to erythromycin; they have a similar "spectrum" of activity and exhibit at least some degree of cross-resistance to it. In order of their discovery these are:—

Carbomycin. The range of activity of carbomycin is practically identical with that of erythromycin but at a lower level. Its therapeutic activity is decidedly inferior and cross-resistance is close if not complete.

Spiramycin. This antibiotic was discovered in France and is used there and in the United States where it is commercially available as "rovamycin." Its activity is decidedly inferior to that of erythromycin but cross-resistance is the exception rather than the rule.

Oleandomycin was first designated P.A.105 and is marketed as pure oleandomycin under the names "matromycin" and "romicil" and as a mixture with twice its weight of tetracycline under the names "sigmamycin" and "P.A.755." The range of activity of oleandomycin appears to correspond closely to that of erythromycin and cross-resistance in strains of staphylococci has been found; but cross-resistance does not appear to be the rule in naturally occurring strains of staphylococci.

The paper then goes on to describe investigations designed to answer two questions (1) the activity of oleandomycin alone and in combination with tetracycline and (2) the closeness of the relationship between members of the whole group from which it may be deduced how far acquired resistance to each involves the others.

The minimum inhibitory concentration of oleandomycin against 58 strains of *Staph. pyogenes*

was compared with that of erythromycin and showed that the degree of activity of oleandomycin was inferior to that of erythromycin.

Extensive experiments failed to demonstrate the synergic action claimed for a 2:1 mixture of tetracycline and oleandomycin against staphylococci.

The remainder of the paper deals with extensive studies of habituation to tetracycline, oleandomycin and P.A.755 and studies of cross-resistance between oleandomycin and erythromycin. The evidence hitherto available on the subject of cross-resistance was conflicting. These studies showed that while complete cross-resistance develops *in vitro*, erythromycin-resistant strains isolated from patients may or may not be resistant to oleandomycin and spiramycin. Efforts to identify the factors determining the type of resistance developed were fruitless.

G. F. B.

Vibrionic Abortion in Sheep. I. Transmission and Immunity. JENSEN, R., MILLER, V. A., HAMMARLUND, M. A., & GRAHAM, W. R. (1957). *Am. J. vet. Res.* **18.** 326-9.

No abortions occurred in 68 ewes mated with rams known to be infected with *Vibrio fetus*, but 17 (74 per cent.) of 23 ewes that had been mated with clean rams aborted after being fed with about 40 grammes of infected foetal tissue during the fifth month of pregnancy. These results suggest that the contamination of food and water is an important factor in the spread of the disease, and that the application of hygienic measures early in an outbreak should prevent or retard its spread to susceptible ewes.

Ewes that had aborted the previous year due to *V. fetus* infection showed a solid immunity when challenged by the oral administration of infected foetal material, as did ewes that had been fed similar material prior to pregnancy.

Furazolidone for Infectious Enterohepatitis (Blackhead) of Turkeys. JERSTAD, A. C. (1957). *Am. J. vet. Res.* **18.** 174-9.

The author describes a series of experiments on the prevention and treatment of blackhead by the use of furazolidone in the food. The disease was reproduced by placing birds in pens in which clinical cases had previously occurred, thus simulating farm conditions.

The use of 0.02 per cent in the mash (unmedicated grain being offered *ad lib.*) prevented deaths in six- to eight-week-old poults exposed in this way, but some deaths occurred after the cessation of treatment. In established outbreaks the use of 0.0165 and 0.02 per cent. in the total diet of three- to four-month-old birds usually checked the losses within eight days.

There was no adverse effect on appetite or weight gain when normal poults were given 0.02 per cent. of furazolidone in their food for three weeks. Breeding hens that received 0.02 per cent. for 35 days showed no adverse effect on fertility or hatchability, but the onset of egg production was delayed for about two weeks.

E. A. G.

Chlortetracycline Supplements in Rations for Pigs. MACDOUGALD, W. L. (1957.) *Irish Vet. J.* **11.** No. 5.

A litter of 10 pigs at weaning was divided into 2 groups. The pigs had been given routine injections of iron carbohydrate complex during the first 14 days of life, wormed with sodium fluoride, and vaccinated against swine erysipelas. The daily ration included 2 lb. pig fattening meal per animal, increasing to 6 lb. during the 12-week period of the trial. In the case of the treated group, Aurofac "A" was added at the rate of 10 lb. per ton of food. The pigs were housed throughout the trial and each animal was weighed once weekly. No effort was made to confirm virus pneumonia in the herd, and no necropsy was performed at the end of the experiment.

The net average live-weight increase in the control group was 62.6 lb., and in the antibiotic group 76 lb., or a net live-weight increase over the control of 13.8 lb. Pigs in the antibiotic group showed early "bloom" and did not cough, unlike the controls. This absence of coughing in the antibiotic group is assumed to be due to the antibiotic suppressing the spread of virus pneumonia, as well as increasing food-conversion ratio.

The Enhancement of Virus Pneumonia of Pigs by the Migration of *Ascaris suum* Larvae. UNDERDAHL, N. D., and KELLEY, G. W. (1957.) *J.A.V.M.A.* **30.** 4. 173-76.

Pigs were experimentally infected with virus pneumonia—virus plus Ascaris—and with Ascaris only. Two of the 4 V.P.P. only pigs had lesions typical of the lung consolidation found in disease-free pigs inoculated with V.P.P., when slaughtered 3 weeks later. Lesions were small and plum coloured on the anterior lobes of the right lungs. The other 2 V.P.P. pigs showed no lesions. These 4 pigs neither coughed nor was growth retarded.

Seven pigs were given Ascaris eggs with V.P.P. virus 5 days later, and showed a tenfold increase in lung consolidation. Lungs were larger, swollen to 1½ times the normal, with consolidated areas round the edges of both lungs. Coughing and thumping was noticeable between the 7th and 10th days. At this time they went off feed for a few days and returned to normal, showing no more symptoms. One pig given Ascaris plus virus died of pneumonia, and was found to have approximately 14,000 larvae in the lungs and trachea. No larvae were found in the lungs of the remaining pigs.

The 4 pigs given Ascaris only also thumped, coughed, and went off feed between the 7th and 10th days, but at necropsy 3 weeks later no lung lesions were found, except pin-point haemorrhages on lower tips of the diaphragmatic lobes. This experiment tends to show that pigs inoculated with V.P.P. during the migration of Ascaris larvae through the lungs, show consolidation 10 times as great as in pigs with only V.P.P. virus. The lung lesions in the V.P.P. plus Ascaris pigs were more typical of those seen in field cases. It is therefore recommended that measures be taken to control ascariasis to reduce the effect of virus pneumonia of pigs.

D. J. A.

News and Comment

CONGRESS PAPERS

Those members of the Association who have asked for Congress papers in advance should be receiving them almost immediately if they have not already done so. Three papers are slightly delayed. Members attending Congress will find copies of these papers awaiting them in the Congress secretarial office; other members who have applied will receive them by post.

THE HOUGHTON POULTRY RESEARCH STATION

Professor J. S. Garside, PH.D., M.R.C.V.S., D.V.S.M. (VICT.), has recently been appointed Senior Principal Scientific Officer in charge of the departments of pathology and virology. It is hoped that he will take up his appointment at Houghton in the spring of 1958.

Many members of the poultry industry will remember Professor Garside as one of the first veterinarians to enter the field of poultry pathology.

From 1940 to 1949 Professor Garside was Senior Lecturer in Bacteriology at the Royal (Dick) Veterinary College, Edinburgh, and was head of that department for the last 3 years. In 1949, Professor Garside became Reader in Bacteriology and Pathology at the Khartoum Veterinary School, Sudan, and was appointed Professor in 1951 in the newly created Faculty of Veterinary Science of the University College of Khartoum (now the University of Khartoum), and has been Dean of the Faculty since its inception. The development of this Faculty from a small school to a fully-fledged faculty of the University has been Professor Garside's main responsibility during these years.

Mr. H. McINTYRE

Mr. E. J. Hodgkinson writes:—

Mr. McIntyre died in hospital on August 2nd last, after being in ill health for some time. A hardy Scot, he began practice in Leek in 1910 after an assistantship in Essex.

He was a capable practising veterinary surgeon and in his early days was actively associated with the East Midlands Division of the B.V.A. A few years ago he was made a life member.

He was a great lover of horses and was at one time a member of the High Peak Hunt, and in 1922 was successful in winning the Members' Race and High Peak Cup at the Hunt's point-to-point. Mr. McIntyre was widely associated with Freemasonry, a member of several Lodges, and a Grand Lodge officer. To his widow we offer our deepest sympathy.

The funeral service took place on Tuesday, August 6th, at the Leek Parish Church, followed by cremation at Carmountside. The large congregation present included the following members of the profession: Messrs. T. G. Bonallo, E. R. Corrigal, M. G. Davies, E. J. Hodgkinson, M. K. Snow, and R. T. Watson.

UNIVERSITY NEWS

Liverpool

Degree of B.V.Sc. Second Examination

Part III (Animal Management). July, 1957

Allen, W. M.; Davies, J. O.; Dawkes, B. H.; Evans, W. E. S.; Fell, C.; Green, P. B.; Gyening, E. O.; Hopkins, D. L.; Hughes, Margaret; Jones, G. W.; Jones, R. M.; Jones, R. S.; Milner, N. A.; Nairn, A. D.; Pinnell, J. A.; Procter, G.; Shreeve, B. J.; Taylor, K. C.; Thomas, J. K.; Vaughan, A.; Walker, D.; Walker, D. E.; Westbrook, R.; Zagni, P. A.

TRAINING PUBLIC HEALTH INSPECTORS

The recently formed Public Health Inspectors Education Board announces that it intends 1958-9 to be the first session of its new training scheme. Entrants to the scheme must have General Certificates of Education in 4 approved subjects at Ordinary Level, or certain other approved qualifications. The new scheme envisages a 4-year course of training, under a system of paid pupillage with local authorities. It will be on the basis of part-time day release, or an equivalent arrangement such as a " sandwich "-type course, with an examination at the end of each year of training. The position of students already in training will be safeguarded. The work of the new scheme will be administered on behalf of the Board by the Royal Society of Health.

GOLF COMPETITIONS AT CONGRESS

Entries are invited for the Simpson Golf Trophy competition which is for gentlemen, and for the Dunkin Golf Trophy for ladies. The competitions will be played at the Gog Magog Golf Club, Cambridge, and in addition to sending in their names and handicaps, players are asked to say whether they wish to take luncheon, tea, or both at the club-house where arrangements are very kindly being made by the club officials.

Communications should be addressed as early as possible to Mr. S. F. J. Hodgman, The Animal Health Trust, Canine Health Centre, Kennett, Nr. Newmarket, Suffolk.

ERRATUM

In THE VETERINARY RECORD of July 27th, page 721, there was a note on the recent meeting of the Study Commissions of the European Association for Animal Production held at Luxembourg in June.

We regret that the name of Professor Alex Robertson was incorrectly included among the Society's delegates, and remarks were attributed to him which were made by Dr. Alan Robertson of the Institute of Animal Genetics, Edinburgh.

Among the delegates from the British Society of Animal Production was Lord Digby, who is a Vice-President of E.A.A.P. and represents the B.S.A.P. on the Council of the European Association.

INTERNATIONAL CO-OPERATION

France

Veterinary student (girl) from Paris seeks accommodation *au pair* with the family of an English veterinary surgeon in September or October. Replies should be sent direct to: Mlle Poirion, 42ter Avenue Foch, Fontenay s/s. Bois, Seine, France.

Belgium

Sister of a Belgian veterinary surgeon (a laboratory assistant, aged 20) seeks board and lodging for a 3-month visit to England. This is recommended to us as a very deserving case. If any member can help, will he or she please write to the Assistant Secretary, B.V.A., at 7, Mansfield Street, London, W.1.

ANIMAL HEALTH TRUST AWARDS

The Animal Health Trust announces the following educational awards for 1957-8.

Wellcome Fellowships

L. F. Taffs, M.R.C.V.S., Downing College, Cambridge. Mr. Taffs has held a Research Training Scholarship from the Animal Health Trust since 1953, and will now continue his studies on the immune reactions of pigs to *Ascaris lumbricoides* from 2 standpoints, *viz.* (1) cellular reactions of the host, and (2) antibody production by means of the conglutination complement absorption test. This work will be carried out at the Department of Animal Pathology, School of Veterinary Medicine, Cambridge, under Professor W. I. B. Beveridge.

J. S. M. Hutchinson, B.SC., Nottingham University School of Agriculture. Mr. Hutchinson will carry out a quantitative evaluation of the changes in gonadotrophin levels in the pituitary gland of the ewe in different reproductive states by means of a biological assay in conjunction with cytological studies. He is to work at the Biochemistry Section, Department of Agricultural Science, University of Nottingham, under Dr. H. A. Robertson.

P. J. McCosker, B.V.SC., who is an Australian, and qualified at the University Veterinary School, Queensland, receives a Junior Wellcome Fellowship to enable him to study aspects of copper metabolism in the bovine blood at the Department of Clinical Studies, University of Cambridge, under Professor L. P. Pugh.

Research Training Scholarships

F. A. Harrison, B.V.SC., M.R.C.V.S., University of Liverpool, to enable him to take an honours course in physiology leading to a B.Sc. (Hons.) degree. Mr. Harrison wishes to become a veterinary physiologist preparatory to specialising in veterinary clinical studies, and will be studying under Professor R. A. Gregory in the Department of Physiology at the University of Liverpool.

D. F. Kelly, B.V.SC., M.R.C.V.S., who qualified at Bristol University with the aid of an Animal Health Trust Evans Final Year Studentship, now gains a Research Training Scholarship to undertake further studies in general pathology with a view to taking up research in veterinary medicine with particular reference to the diseases of young animals. He will work at the Department of Pathology, University of Cambridge, under Professor H. R. Dean.

D. B. Ross, B.V.M., M.R.C.V.S., Trinity College, Cambridge, who is to study the mineral metabolism of sheep, with special reference to the mechanism responsible for homeostasis. His work will be carried out under Professor Beveridge at the Department of Animal Pathology, Cambridge.

Evans Final Year Studentships

ROYAL VETERINARY COLLEGE, LONDON. This award will be made in December, 1957, by which time the winning student will have passed his first clinical examination and completed 2 terms of instruction in medicine, surgery, and special pathology. He will thus have 3 more terms of study to complete his course.

VETERINARY COLLEGE OF IRELAND. Michael P. Kenney, Swinford, Co. Mayo.

UNIVERSITY OF CAMBRIDGE. J. A. Parry, B.A., Llanfarian, Aberystwyth.

UNIVERSITY OF LIVERPOOL. M. J. Sulley, Market Harborough, Leics.

UNIVERSITY OF GLASGOW. J. M. Bowie, Stranraer.

ROYAL (DICK) SCHOOL OF VETERINARY STUDIES, EDINBURGH. B. F. Leek, King's Norton, Birmingham.

UNIVERSITY OF BRISTOL. B. Cook, Totton, Hants.

PERSONAL

Births

BROWN.—On August 11th, 1957, to May (*née* Hutchison) wife of Alexander C. L. Brown, M.R.C.V.S., at The Bearsted Memorial Hospital, Hampton Court, Middlesex, a son.

COHEN.—On July 31st, at Mill Road Hospital, Liverpool, to Audrey (*née* Kemp), wife of Cecil A. Cohen, B.V.SC., M.R.C.V.S., a daughter.

MUIR.—On August 11th, to Moyra, wife of Robert Muir, M.R.C.V.S., Nether House, Alnwick, a daughter.

TYRRELL.—On August 8th, 1957, at Somerleigh Court, Dorchester, to Mary, wife of K. M. Tyrrell, B.A., B.SC., M.R.C.V.S., 22, Rothesay Road, Dorchester, a brother for Hugh.

OBITUARY

Hector McIntyre of Mount Pleasant House, Leek, Staffs. Graduated Glasgow, December 21st, 1903. Died August 2nd, 1957, aged 75 years.

COMING EVENTS

August

25th-31st. 75th Annual General Meeting and Congress of the B.V.A. at Cambridge.

ADDRESSES OF DISEASE INFECTED PREMISES

Fowl Pest

Suffolk. Jeny's Lane, Gislingham, Eye (Aug. 9).

Swine Fever

Berks Galbridge Farm, Holyport (Aug. 6); Warfield Stores, Warfield Street, Bracknell (Aug. 7); Dean's Farm Appleton, Abingdon; Collins Farm, Frilford, Abingdon (Aug. 9); East Park Farm, Lands End, Twyford, Reading; 60 Garden Cottages, Maidenhead (Aug. 12).

Carms. Llyshendy, Llanstephan (Aug. 6); Voelfach, Blaencoed Road (Aug. 9).

Derbys. Hall Farm, Hundall, Unstone (Aug. 7).

Devon. Rose Villa, Sandford, Crediton (Aug. 12).

Dorset. Hill View Dairies and Downs Farm, Okeford Fitzpaine, Blandford Forum (Aug. 3).

Essex. Brick House Farm, Mundon, Chelmsford (Aug. 9).

Hants. The Barn, Broad Leys Farm, Mead End, Sway, Lymington (Aug. 3); 5 Bell Lane, Blackwater (Aug. 6).

Herts. Hazel Farm, Hooks Cross, Walton at Stone (Aug. 8).

Kent. "Joyden," Grays Road, Westerham Hill, Westerham (Aug. 3); Hartridge Farm, Maidstone Road, Marden, Tonbridge (Aug. 7).

Lincs. Long Drive, Thurlby Fen, Bourne (Aug. 7).

Middlesex. No. 2 Smallholdings, Clockhouse Lane, Ashford (Aug. 6).

Pembroke. Little Hook Farm, Ambleston (Aug. 3).

Somerset. Home Farm, Ston Easton, Bath (Aug. 12).

Staffs. Dunns Bank, Quarry Bank, Brierley Hill; Conquerors Farm, The Straits, Lower Gornal, Dudley (Aug. 6); 56, Knowles Hill, Rolleston-on-Dove, Burton-on-Trent (Aug. 9); Gainsborough Hill Farm, Stonnall, Walsall (Aug. 12).

Surrey. Fullers Farm, East Clandon, Guildford (Aug. 3); Paddington Farm, Abinger Hammer (Aug. 6); Shellwood Mill, Leigh Reigate (Aug. 8); Keens Farm, Bell Lane, Fetcham, Leatherhead (Aug. 12).

Sussex. Upper Chancton Farm, Washington, Pulborough (Aug. 6).

Warwicks Pear Tree Farm, Warstock, Birmingham 14 (Aug. 12); Bromleys Caravan Site, Barkeys Lane, Wythall, Birmingham (Aug. 12).

Worcs. Barnett Mill Farm, Harvington, Kidderminster (Aug. 6).

Yorks. Kassell Street Allotments, Castleford (Aug. 3); School Farm, South Hiendley, Barnsley; "Tevant," East Keswick, Leeds (Aug. 12).

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the B.V.A.

Treatment of Copper Deficiency in Cattle and Sheep by Intramuscular Injection of Copper Glycine (Copper Amino-acetate)*

Sir,—Copper deficiency in ruminants is recognised in many parts of the country; up to now, it has been treated by adding copper sulphate to the food, or by intravenous injection, or with mineral supplements. Certain disadvantages may be associated with each of these forms of treatment.

I wish to record preliminary observations of some clinical trials in which copper glycine preparations were used parenterally and were found to provide a safe and convenient way of administering copper to ruminants.

In New Zealand, this preparation was first used by Cunningham (1957) and shown to provide a suitable source of parenteral copper.

In our trials the copper status of the animal was determined by estimating the copper in the blood or liver.

Cattle

A single dose containing 120 mg. copper (as 400 mg. copper glycine) in an oily base was injected intramuscularly into the gluteal or biceps femoris muscles or subcutaneously into the loose skin in front of the brisket. Strict aseptic precautions were taken. Liver biopsy samples were taken before and at various intervals after the administration of copper. Similar biopsies were carried out on control animals. Seventy-three animals were used in these trials. A somewhat severe local reaction occurred at the subcutaneous site. When the intramuscular route was used, local reaction occurred in many animals which varied from a slight, small induration at the site of injection to a visible enlargement; the rate at which they subsided varied from a few days to 3 weeks. None of the reactions appeared to cause inconvenience and there was no lameness; in milking animals there was no loss of milk yield.

Liver copper values indicated that the absorption of copper from this preparation was satisfactory; after 1 or 3 weeks they were similar to those obtained with similar doses of copper by intravenous injection.

Sheep

A similar preparation containing 45 mg. copper (as 150 mg. of copper glycine) was used. Copper absorption here was also satisfactory, and there was no reaction after injection by either the subcutaneous or intramuscular routes. Fifty-four animals were used in this trial.

These findings, in agreement with those of Cunningham, show parenteral administration of copper glycine to be effective in increasing the copper status of cattle and sheep.

I wish to thank Glaxo Laboratories Ltd. for supplying the above copper preparations.

Yours faithfully,
RUTH ALLCROFT.

Ministry of Agriculture,
Veterinary Laboratory,
Weybridge,
Surrey.

Reference

CUNNINGHAM, I. J. (1957). "Parenteral Administration of Copper as Cerate to Cattle and Sheep." *N.Z. Vet. J.* **5**. 9.

* Copper "120" Injection Glaxo for Cattle and Copper "45" Injection Glaxo for Sheep.

A SCALE OF PROFESSIONAL FEES

Sir,—I wish to associate myself with the opinions expressed in Mr. Basinger's letter of July 31st.

That status and income go hand in hand in an inflationary economy is an established fact. This may not always have been the case in this country but it is undoubtedly true to-day.

May I draw the attention of your readers to an article in the national press? This article enumerates the expenses incurred in training and racing 1 horse in 1 week, the total is £37 6s., broken down as follows:—

Training Fee	... £10
Blacksmith ...	... £1 5s.
Veterinary Fee	... £1 1s.
Entry Fee ...	... £5
Jockey's Fee	... £5
Horse Box ...	... £15

This may or may not be a good example of actual trainer's expenditure, but it is an excellent example of our relative worth in the eyes of the general public.

Yours faithfully,
D. BEATON.

"The Lodge,"
Ashby Folville,
Leics.

August 11th, 1957.

Sir,—In reply to R. W. Graham's letter in THE VETERINARY RECORD of August 3rd, 1957, I should like to draw his attention to an article which appeared in an American publication, *Veterinary Record*, in July, 1957, and which I am enclosing.

The extracted paragraphs express the gist of the article and might, in connexion with Mr. Graham's suggestions, be more applicable than a direct monetary scale.

Yours faithfully,
A. D. A. ISHERWOOD.

100, South Street,
Tarring,
Worthing,
Sussex.

August 7th, 1957.

The paragraphs are as follows:—

The plan (for a fee schedule guide) differs from usual fee scheduling proposals in that it is based on the relative values of specific services instead of their dollar value.

An acceptable unit value table might be worked out for veterinary services which would, at least, assure consistency of charges in proportion to their professional values.

This type of procedure allows freedom to set individual fees, yet provides a guide for comparison.

Sir,—I have read Mr. Straiton's articles, listened to his address, and have become quite a "fan." I am prompted to write having been struck by the lack of unreserved compliments paid to his work as a practitioner and should like to offer mine. I have done my 30 country calls or 300 cattle tested in a day, but never more than 30,000 miles in a year, and there is no doubt I have been shaken out of my complacent thoughts of having been busy.

His latest remarks about fees and income have made me an even more ardent "fan." I feel that, in discussions on raising the status of the profession, seldom has the nail been hit more squarely on the head than in saying that we should maintain a reasonable standard of fees and take strong action against price cutting.

I am sure the undesirability of such standard fees would be outweighed by the advantage. It could be a minimum, with good luck to those working in areas where they could reasonably charge more in the light of local circumstances, etc. Of course reasonable allowance, or no fee at all, should be arranged for poor persons.

If one queries, for example, a solicitor's or valuer's account, one swiftly hears "that is the standard fee—I cannot charge you less even if I wished to."

If we could request Mr. Straiton to present a scheme for discussion by every Division, and he consented to do so, then with his drive behind it the scheme should succeed to the great benefit of the profession as a whole and to the majority of us individually.

Yours faithfully,
J. A. WHITE.

Commonwood House,
Riverford,
Crownhill,
Plymouth.

August 1st, 1957.

It is requested that correspondence on car mileage should now cease. Comment upon the use of two-way radio telephones in veterinary practice, and scales of professional fees, are still welcome.

Sir,—Having stated in my last letter that the profit margin in agriculture is narrowing I was perturbed to read that my friend, Mr. D. Basinger, writing from Essex, thought that "farming has never had it so good."

I referred to experts and found the following interesting facts: comparing 1954-5 with 1955-6 the profitability of farming over the country as a whole has fallen by 3.1 per cent. In Northumberland it has fallen 12.5 per cent., whereas in Essex it has risen 8.6 per cent. during the same period.

Yours faithfully,
J. P. PICKERING.

Orchard House,
Priestpopple,
Hexham,
Northumberland.

August 12th, 1957.